



AEDT News

A V I A T I O N E N V I R O N M E N T A L D E S I G N T O O L

September 2009

Welcome

Ralph Iovinelli, FAA AEE

The Aviation community never stops and the aviation environmental modeling practitioners are no exception – it seems like you never sleep! Modeling analyses are underway around the clock, and around the world. No question about it, we work in a very dynamic industry and our environmental tools are evolving to meet continual challenges. Today's release of INM7.0b and EDMS5.1.1 further harmonize the common system databases between these two models. These two tools are closer than ever before regarding aircraft performance computations, coverage of today's flying fleet, and physical airport data. I welcome you to read more about the model improvements in this newsletter as well as the individual release notes on FAA's website. These updated legacy tools continue to set the stage for the single integrated noise and emissions model – the Aviation Environmental Design Tool (AEDT).

The development team is working feverishly on the inaugural release of AEDT and we're happy to announce that testing of our first BETA will begin in Spring 2010 with the members of our Design Review Group. Our first BETA will focus on regional capabilities for airspace redesign and environmental review of new operational procedures. Fuel burn, noise, and emissions will be simultaneously generated and aircraft movements can be inputted from a variety of sources such as radar data, simulation output, or other forms of movement data using the AEDT standard input format. This is a huge leap in capability and functionality but that's not all. You can expect more advances with fleet data that virtually eliminate the need for designating aircraft substitutions. In addition, dramatic improvements in our aircraft performance capabilities demonstrate fuel burn consistency within five percent based on gold standard flight data recorder information.

Finally, we are designing the AEDT user interface with easy-to-use screens that will be extremely familiar to INM, NIRS, and EDMS users today. In addition, large datasets can be imported to avoid tedious data entry. As we near the BETA testing time, our team hopes to provide ample documentation to help users warm up to this new model. The best recommendation to prepare yourself or your team for AEDT is to understand structured query language (SQL) databases, which will replace the DBF files used for legacy models. Best wishes and happy modeling. ✈

Websites to Visit

These three websites provide information regarding AEE tools, including AEDT and the other tools in the AEDT Tool Suite.

AEE Tools FAQ:

<http://www.faa.gov/about/office%5Forg/headquarters%5Foffices/aep/models/toolsfaq/>

AEE Conference Presentations:

http://www.faa.gov/about/office_org/headquarters_offices/aep/models/history/

AEE Research and Development

http://www.faa.gov/about/office_org/headquarters_offices/aep/research/

How AEDT Is Being Used Right Now...

Christopher Roof, Volpe National Transportation Systems Center

The following is an update of the article by the same name in the October 2008 issue of AEDT News. While preparations are at full speed for the release of AEDT Version 2.0 in 2011, pre-release versions of the tool are being exercised for a number of analyses by multiple groups. These efforts are separate from the formal beta testing that AEDT 2.0 will undergo, but serve a similar purpose in that they help the development team to understand potential gaps in the software and databases and address them prior to wider distribution of the tool.

Two teams working on a National Aeronautics and Space Administration (NASA) “Integration of Advanced Vehicle Concepts into NextGen” project are actively using an alpha version of AEDT. The goal of this project is to understand the impacts of the use of advanced vehicles and procedures in the national airspace system (NAS), including any tradeoffs involved. The teams, led by Raytheon and Sensis, are modeling fuel burn, noise and emissions for NAS-wide scenarios, as well as more detailed metroplex studies. While the project is still underway, AEDT development team support of the effort has realized significant improvements in aircraft performance modeling capabilities and system database robustness – aspects of which will directly benefit AEDT 2.0 users.

In cooperation with Eurocontrol, the FAA is involved in the Atlantic Interoperability Initiative to Reduce Emissions (AIRE). This project has the goal of generating innovative solutions that offer environmental protection and system efficiencies in the near term and future. AIRE is currently focusing on the oceanic arrival and surface domains of flight. AEDT is being used to predict fuel burn and emissions savings associated with various operational and procedural changes.

The Joint Program Development Office (JPDO) Interagency Portfolio and System Analysis (IPSA) division regularly undertakes domestic, NAS-wide scenario analyses investigating the effects of various aspects of the introduction of NextGen. This year the IPSA modeling team has agreed to exercise AEDT for their analyses. Specifically, all fuel burn and emissions results will be derived using an alpha version of the tool; noise will be modeled using the legacy tools during this round of analysis. However, this will be transitioned to AEDT in the near future as well. The integration of noise modeling is considered an important step in the harmonization and integration of environmental tools for use at all levels of analysis.

Throughout the remainder of AEDT Version 2.0’s development, the tool will continue to be exercised for fuel burn, noise and emissions interdependency analyses. Results will be communicated in a variety of forums, as appropriate. ✈

Process for Submitting Request for AEE Review/Approval

The FAA’s noise models, such as INM, have blanket approval for use in any FAA Order 1050 environmental assessments (EA) and environmental impact statements (EIS), FAR Part 150 studies, and FAR Part 161 applications. Some noise analyses may require additional models, modeling methods or non-standard modeling input data. In these cases, written approval is needed for all non-FAA noise models, noise modeling methods or non-standard modeling inputs prior to use in the noise analysis. *A written request must be submitted to the appropriate FAA regional office. The request will then be forwarded to the FAA Airports Office at Headquarters (APP), and then to AEE. AEE will work directly with the requestor on any technical issues and provide written decision through APP. The request and decision should be included in the documentation of the project.*

AEDT Aircraft Performance Modeling

Eric Dinges, ATAC Corporation

As mentioned in previous newsletters, AEE is developing a robust new aircraft performance modeling capability within AEDT. The first step in this process has been harmonizing aircraft performance modeling across the existing legacy tools. INM7.0b and EDMS5.1.1 now use a common computational module for their calculations. NIRS7.0 also directly leverages this module. These calculations are based on the Society of Automotive Engineers (SAE) Aerospace Information Report (AIR) 1845 (SAE-AIR-1845), European Civil Aviation Conference (ECAC) Document 29, and Eurocontrol's Base of Aircraft Data (BADA) methods. A single module handles terminal area, regional, and runway-to-runway trajectory and fuel burn calculations. As development continues, this module will include a full gate-to-gate capability with improved use of available weather data.

Another AEDT performance modeling component brings the existing performance modeling capabilities of NIRS7.0 into AEDT. This module is currently capable of calculating SAE-AIR-1845 profiles that match input trajectories defined from aircraft position data obtainable from different sources such as radar, Flight Data Recorders, and simulation models. The combination of this current capability with performance modeling capabilities traditionally in INM and EDMS is currently being tested within an alpha version of AEDT to model aircraft performance using simulation data as part of the NASA Advanced Vehicles NRA (see *How AEDT Is Being Used Right Now* in this newsletter). These capabilities are also being used to model observed Optimized Profile Descents (OPD) using radar data in support of the Atlantic Interoperability Initiative to Reduce Emissions (AIRE) program. To support NIRS functionality, the computations are being enhanced to not only follow input aircraft position data directly, but to also be able to follow Air Traffic Control (ATC)-like instructions, including altitude and speed controls, to generate a flight profile. This capability, used in conjunction with the new AEDT Airspace Database covering NAVAIDS, Fixes, and route information as described below, will provide a significantly more flexible means for defining aircraft flight profiles for airport noise and emissions studies.

For example, many legacy tool users that perform noise and emissions modeling are already sensitive to the issue that both INM and EDMS provide something called a "STANDARD" flight profile definition. In most cases the flight profile is assumed to be an unrestricted climb for departures or a simple gradual descent into the airport for arrivals. When focusing on local air quality (LAQ, or emissions below 3,000 ft) or 65 DNL contours, use of a standard profile is not really an issue; however if investigating lower noise levels, or if the airport/airline has specific flight procedures that augment the vertical profile, the only "dial" for adjusting a profile is aircraft weight. When performing a Federally-sponsored INM analysis within the U.S., variation in vertical profiles is attained through review of INM documentation and then undertaking the process of developing a user-defined profile for review by FAA's Office of Environment and Energy (AEE). Within AEDT, however, the ability to define a specific vertical profile for an aircraft will still exist, but in most cases the AEDT aircraft performance computations will directly provide the desired capability. Leveraging new methods and some found in the legacy NIRS model, the AEDT user will be able to provide flight path and/or airspace rules that not only better account for the baseline conditions, but also provide some guidance where radar or other aircraft position data do not exist for new routes.

In addition to expanding existing performance modeling capabilities, the AEDT development process is also improving the fidelity of those capabilities, with a particular focus on fuel burn calculations. The AEDT development team is making use of aircraft manufacturers' engineering flight performance models to develop improved data and methods for calculating terminal area (i.e., speeds less than cruise) fuel burn in preparation for the release of AEDT2.0. Results from these new data and methods have been compared against real-world cockpit flight data recorder data from a number of domestic and foreign carriers flying a variety of domestic and foreign routes, and have illustrated calculated fuel burn accuracy within a range of about 5% for Boeing aircraft.

Separate from the new methods and data being developed for the release of Version 2.0, the current AEDT (as well as EDMS5.1.1) incorporates Eurocontrol's newly released BADA3.7 data, which provides further improvements in terminal area fuel burn modeling accuracy. Table 1 below shows the average relative magnitude of calculated fuel burn differences between the previously used BADA3.6 data and the new BADA3.7 data for several Airbus aircraft types. These values were calculated from a sample of about 100 typical flights for each aircraft type. It should be noted that exact fuel burn differences vary by aircraft weight, flight profile definition, and atmospheric conditions modeled for a given flight so your mileage may vary (pun intended). A previous study of cockpit flight data recorder data showed over-prediction of terminal

area fuel burn for Airbus aircraft using BADA3.6 data on the order of 20 percent. The differences in Table 1 represent improvements in accuracy, and bring the calculated fuel burn more in line with what has been observed in cockpit flight data recorder data. These particular improvements benefit EDMS5.1.1 users today, and when combined with the other efforts at improving fuel burn calculations mentioned above will result in an AEDT tool that is much more accurate than previously available environmental modeling tools. ✈

Table 1: Percent Difference in Calculated Terminal Area Fuel Burn, BADA3.7 vs. BADA3.6

| Aircraft Type | Takeoff | | Approach | |
|---------------|--------------------|---------------------|--------------------|---------------------|
| | Altitude < 3000 ft | Altitude < 10000 ft | Altitude < 3000 ft | Altitude < 10000 ft |
| A319 | 5.7% | 5.6% | 5.7% | -1.5% |
| A320 | -22.5% | -17.6% | -22.4% | -19.8% |
| A321 | -6.1% | -4.3% | -6.5% | -9.8% |
| A332 | -17.7% | -14.1% | -18.7% | -16.5% |
| A343 | -21.6% | -18.4% | -21.9% | -10.0% |

What's the difference between a study, scenario, and case?

Within AEDT, users will have increased flexibility in how they organize the data that defines an analysis or the elements that make up an analysis. Specifically AEDT introduces a hierarchical structure similar to the folder structure available within the MS Windows operating system. The folders within AEDT have unique meaning to AEDT but also provide the AEDT user with a mechanism for managing and organizing the elements of their analysis. For example, if a user needed to analyze the potential environmental impacts related to an airport defining a new departure procedure, they would begin by creating an AEDT Study. Within AEDT the user would identify the airport(s) of interest and associate it/them with the AEDT Study and additional background information including the type of study, runtime parameters, locations (or Receptors) of interest, and the desired units of measure. Once the study is created, the user can begin to define the scenarios to be compared (typically a baseline along with no action and alternative scenarios). Within a scenario the user then begins to define the actual work elements of the Scenario which are called Cases within AEDT. An individual Case could contain all of the operational information for a scenario or could be divided by what ever criteria the user needs. For example the user may want to separate departures from arrivals and therefore create two cases. Another option might be to organize the operational data by runway configuration or by aircraft weight. Within AEDT the user can define the elements of the Scenario to meet the needs of the analysis.

Study – Collection of scenarios and supporting data; highest level document

- May contain multiple airports, each of which may contain multiple layouts

Scenario – Collection of one or more cases that must have common time durations and run/output properties

- May contain multiple airports, each airport can only have a single layout assigned
- References receptors, output metrics & run options
- Users may run scenarios and/or individual cases within a scenario

Case – Represent activities at an airport over a specific time period

- Cases are source type specific. The source types are Aircraft, GSE, APU, Stationary Sources, Parking Facilities, Roadways, and Training Fires.
- Cases may contain operations or may simply act as folders for sub-cases
- Each case may contain its own set of weather or may inherit weather from a parent case or scenario

Modeling Air Traffic in the Air Space

Andrew Hansen, Volpe National Transportation Systems Center

Michael Graham, Metron Aviation

The importance of knowing where you are is a truism in aviation. Indeed, the primary purpose of aviation is to transport people and cargo from one place to another. Not coincidentally, it is important when modeling the environmental consequences of aviation to know where the aircraft operate. Further, the accuracy of the estimates drawn from environmental models increases as the accuracy and precision of aircraft locations increases. As information becomes more available, AEDT can utilize known information about the air space in which aircraft operate to improve the accuracy of their locations.

Consider the varying levels of information in this series of aircraft operation records:

- 1) The origin and/or destination airports for a particular flight are known;
- 2) The airport configuration at the origin/destination of the operation considered in (1) is known;
- 3) The flight plan for the operation considered in (1) is known and includes the departure procedure, enroute waypoints, and/or arrival procedure;
- 4) The radar track for the flight considered in (1) is recorded; or
- 5) Some combination of the above information is known.

In this progression, increasing knowledge of the aircraft's position is available and can be used to improve the accuracy of the model. This is a desirable outcome and can be accomplished by AEDT.

However, in many situations the additional information in this progression is not available. In these cases, known elements of air traffic control (ATC) can be applied to form approximate information for 2-5. Within AEDT, such ATC information is collected in the AEDT Airspace Database (ASDB).

As an example of air space information, the FAA's National Flight Data Center (NFDC), is responsible for collecting, collating, validating, storing, and disseminating aeronautical information detailing the physical description and operational status of all components of the National Airspace System (NAS). The NFDC maintains the national aeronautical information database, the National Airspace System Resources (NASR), which is updated on a 56-day cycle and captures the set of geographic and air traffic control information used in preparing and filing typical flight plans. This information is useful to AEDT in two ways. When performing regulatory analysis for a noise or emissions study, a user will now be able to overlay various airspace definitions to help validate and/or guide the definition of routes. In the case where no radar data or even flight planning information is available, AEDT can construct routes using the airspace data to again improve the fidelity of the inputs provided to the noise and emissions modules. In the simplest case, the aircraft could be modeled on a great circle (shortest distance) between the origin and destination airports. An improvement to this could be the insertion of waypoints along the route from the ASDB which are specified by the ATC element.

In a slightly more complicated example, the configuration of the airport may be known which gives an indication of which runways and departure/arrival procedures were being used at the time. This information in turn provides more location accuracy in the modeling of the operation.

The information in the ASDB can also be assembled from empirical sources. For example, if a large archive of radar tracks for individual flight operations is available, this historical information can be filtered to synthesize routes into a waypoint form that mimics (and hence can be stored in) the ASDB. Construction of such information also allows the AEDT user to model hypothetical or planned changes in aircraft operations before they have been implemented to estimate the environmental consequences of the planned action.

The description of the ASDB is an open AEDT standard and, although tailored in many ways to accommodate ATC standard information, is broad enough to allow users to construct nearly any scenario for aircraft operations. These include not only basic ATC elements like airways, navigation aids, and preferred routes, but also more complicated elements like altitude or speed constraints, statistical distributions of flight track usage, and even geographic dispersion around routes and airways. ✈

Can We Quantify Trace Organic Gases from Airport Emission Sources?

Debbie Wilson, CSSI

Ralph Iovinelli, FAA AEE

Yes we can! Starting with EDMS5.1 and updated with today's EDMS5.1.1 release, speciated organic gas (OG) emissions (including known hazardous air pollutants or HAPs) can be quantified for airport-related sources using methods proposed by the FAA and EPA.

EDMS5.1.1 has the ability to quantify up to 395 individual OGs from all airport emission sources that exist in the model. Only 44 of these OG compounds, however, are known HAPs, as defined by either Section 112 of the Clean Air Act or the EPA's Integrated Risk Information System (IRIS) database. Most airport studies will not use all of the EDMS emission sources, so the numbers above are worst case. Nonetheless, FAA policy calls for only those individual known HAPs to be disclosed in National Environmental Policy Act (NEPA) compliance documents. To help facilitate reporting, EDMS5.1.1 outputs the OG emissions inventory and labels the individual HAP compounds in a spreadsheet-ready file for tabulation.

Per FAA Order 1050.1E Change 1, *Environmental Impacts: Policies and Procedures*, FAA policy states that "If air toxics analysis is performed, [the Emissions and Dispersion Modeling System] EDMS should be used or supplemented with other air toxic methodology and models in consultation with the appropriate FAA program office and [FAA's Office of Environment and Energy] AEE." In the future, the public release version of AEDT will be the required tool to satisfy this policy requirement.

There are two recently released guidance documents that provide the basis for all OG calculations within EDMS5.1.1. The first is a document titled *Guidance for Quantifying Speciated Organic Gas Emissions from Airport Sources*, which documents the OG emissions calculation methodologies for all airport emission sources, with the exception of aircraft engines powered by Jet-A or JP8 fuels. All methodologies and speciated OG information are from EPA public guidance and databases. AEE has published a companion to this document--*Recommended Best Practice For Quantifying Speciated Organic Gas Emissions From Aircraft Equipped with Turbofan, Turbojet, and Turboprop Engines*. The document details joint FAA and EPA efforts to update OG speciation profile data for aircraft with turbofan, turbojet, and turboprop engines. Both guidance documents are available for download at http://www.faa.gov/regulations_policies/policy_guidance/envir_policy/. ✈

What Weather Data can be used by AEDT?

Average Weather: Historical record of averaged climate (weather) data over several decades at a specified airport – typically temperature data is represented by the 30 year normal data provided by the National Climatic Data Center, which is currently 1971 – 2000, while other weather parameters (wind, humidity, etc.) are long term means calculated using the period of record at the closest weather station for the airport.

Hourly Weather: Actual hourly weather parameters (Temperature, wind speed & direction, pressure, humidity, etc.) processed for use with modeling at a specified location and given time.

Why Assess AEDT?

Rebecca Cointin, FAA AEE

George Noel, Volpe National Transportation Systems Center

The previous AEDT newsletter noted that AEE is undertaking a robust tool assessment effort as part of the development of AEDT. The three assessment elements listed below underpin the philosophy that spending resources to conduct the tool assessment today will yield benefits tomorrow to you, the future AEDT user, regarding confidence in the use of the tool and interpretation of AEDT outputs.

UNCERTAINTIES: Assessment will give you an understanding of how the uncertainties surrounding each input factor affect the output of the tool. It will also provide an understanding of an input's total impact on output variability, whether the main influence is fuel burn, decibel of noise, or engine emission factor. Throughout the assessment process, AEDT's capabilities, limitations, and main causes of model uncertainty are being defined and documented. With that documentation, users will be able to better understand AEDT and what affects the results it produces.

REAL WORLD COMPARISONS: Validation and verification work is based on comparing AEDT's aircraft performance and fuel burn estimation capabilities to cockpit flight data recorder information or other real-world data sets. For instance, this type of work has already benefitted the tool by improving the low speed aircraft performance capabilities for Boeing aircraft within the tool (see *AEDT Aircraft Performance Modeling* in this newsletter). The developers are also comparing the legacy computations (INM, EDMS, NIRS) to those performed by AEDT modules to guarantee consistency, where appropriate. The tool will continue to be validated throughout the development process.

FUTURE INVESTMENTS: The assessment process will give AEE an opportunity to identify and focus research on those areas that provide the greatest improvement in accuracy of the tool. Future development resources will be invested towards inputs, assumptions, and limitations of AEDT that cause the most uncertainty in the output.

When AEDT is publicly released, a document summarizing the assessment findings will be available to all stakeholders. This document will be a reference guide for model users and regulatory reviewers to better understand and interpret AEDT output. ✈

AEDT Terminology

AEE: Above Field Elevation

AGL: Above Ground Level

Altitude: A reference point such as Mean Sea Level (MSL) or the earth's surface (terrain)

Aircraft Operation: Flight operation assigned to an aircraft within a given case. Basis for aircraft emissions and noise calculations

Elevation: Height of the terrain (ft or m) above mean sea level.

Emissions Factor: The rate at which pollutants are emitted into the atmosphere per unit of consumption

Flight Path: 4-dimensional description of an aircraft's trajectory represented by a series of straight-line segments. Combination of Ground Track and Flight Profile.

Flight Profile: 2-dimensional description of an aircraft's trajectory represented by a series of straight-line segments. Flight profile parameters include distance along a ground track, altitude, speed, and thrust per flight profile segment.

Ground Track: 2-dimensional projection, an aircraft trajectory on the horizontal plane. Geographical ground location over for which an aircraft flies

MSL: Mean Sea Level

NPD: Noise Power Distance Data – A set of noise levels, expressed as a function of: (1) engine power, usually the corrected net thrust per engine and (2) distance. They are also operational type and noise metric specific. For helicopters, they are a set of noise levels, expressed as a function of: (1) operation mode and (2) distance.

Operational Distribution: Operational or temporal profile

Receptors: The specified points in space at which modeled metrics are computed (was a "Grid Point" in INM).

Study Aircraft: The aircraft to which operations are assigned within a given scenario

Legacy Updates Released on Sept 30, 2009

EDMS5.1.1 Updates:

- Bug fixes, including capping the emissions inventory to the 20km horizontal threshold for aircraft that do not reach the mixing height within this range; fixing issues with crashing of EDMS5.1 due to SOx indices and configuration changes; fixing import of operational profile data so roadway profiles are properly imported; and correcting updates of UTM conversion to lat/long in southern hemisphere.
- The addition of new aircraft and improved performance data
- Updates of hazardous air pollutants speciation profiles using Speciated Gas-Phase Organic Gas Profile for aircraft equipped with turbofan, turbojet, and turboprop engines from document: *“Recommended best practice for quantifying speciated organic gas emissions from aircraft equipped with turbofan, turbojet, and turboprop engines,”* May 27, 2009 Version 1.0.
- Improvement of functions including the option to choose what pollutant HRE files will be processed for dispersion modeling.
- Updates to a few of the Airport Layout Plans (ALPs) bitmap files for Airport View mode, including Dulles, Seattle and O’Hare.
- Updated Airport Emissions Reduction Credit (AERC) Report for the Voluntary Airport Low Emissions (VALE) program
- Updated EDMS5.1.1 User Manual and Technical Manual to reflect the above changes/updates.

For more information, visit the EDMS website at:
http://www.faa.gov/about/office_org/headquarters_offices/aep/models/edms_model/.

INM7.0b Updates:

- Performance data updates for many existing Airbus aircraft types, replacing existing fixed-point STANDARD arrival flight profiles with new procedural profiles. The affected aircraft types are the A300-622, A310-304, A319-131, A320-211, A320-232, A330-301, A330-343, and A340-211.
- The addition of several new aircraft types to the INM system database, including two A380 variants, a new Very Light Jet (VLJ), and several propeller driven aircraft and helicopters associated with National Parks air tours. The new aircraft are the A380-841, A380-861, A340-642, CRJ-700, CRJ-900, Eclipse VLJ, Cessna 182, Cessna 208, Dornier 228, Dornier 328, Maule M-7-235, Piper 42, Robinson R44, Bell 407, and the Schweizer 300C.
- Bug fixes, including corrections related to improper version labeling, some GUI display issues, a problem with C-weighted noise calculations for helicopters, incorrect reverse thrust assignments for certain flight path segments, lack of directivity adjustments for run-up operation noise calculations, incorrect logic behind the application of the helicopter Source Noise Adjustment Due to Advancing Tip Mach Number to level flyover segments, and a problem with the computation of noise contours for C-weighted and P-weighted metrics.

A detailed description of all of the updates for INM7.0b is included in the documentation distributed with the INM7.0b release. For more information, visit the INM website at
http://www.faa.gov/about/office_org/headquarters_offices/aep/models/inm_model/.

Did you know....?

...EDMS5.0 has ~ 256 Users in 26 Countries
...NIRS7.0 has ~30 Users in 3 Countries
...INM7.0 has ~605 Users in 56 Countries

Aircraft Noise and Performance Substitution List

Bill He, FAA AEE

INM contains a standard aircraft substitution list for use in noise modeling. The substitution aircraft are included to improve aircraft coverage in modeling noise; namely to replace a “missing” aircraft by a type that is available in the standard aircraft list which is acoustically similar. The list in INM7.0b contains 102 jets, 54 turboprops and 103 piston engine props. There have been minimal updates to the standard aircraft substitution list over the years. Typically the list is updated when new aircraft are introduced, or when new substitution aircraft are added.

FAA AEE is undertaking an update of the noise aircraft substitution list. An updated substitution list will result in more consistent modeling results, a reduced burden to users in defining the fleet, and more consistency with AEDT. The current effort focuses on:

- Reviewing and improving the quality of matches for all aircraft in the current list;
- Expanding the list to include some, if not all, previous AEE approvals of “non-standard” substitutions submitted from users; and
- Establishing a standard helicopter substitution list.

Look for more updates on this topic in future AEDT Newsletters! ✈

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